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THE
VETERINARY EXAMINER,
OR
MONTHLY RECORD

OF
**PHYSIOLOGY, PATHOLOGY AND NATURAL
HISTORY.**

No II.

JANUARY, 1833.

Vol. I.

“ It is not in the power of mortals to command success, but we will do more,
try to deserve it.”

HISTORY OF VETERINARY MEDICINE
(Continued from Page 5).

About this time appeared a number of works on the manege, and on Natural History, particularly a work by M. de la Guerincera, entitled *Ecole de Cavalerie*, and the celebrated Natural History, by the Comte de Buffon and M. Daubenton; but as these works have little connection with the diseases of animals, which they mention only incidentally, I shall not here particularize their contents.

Contemporary with Bourgelat, and equal to him in celebrity, flourished La Fosse, the elder, a member of the Royal Academy of Sciences at Paris, and farrier to the King of France. He made many discoveries, and introduced many valuable improvements in the Art of Farriery, particularly an improved method of shoeing; and a Treatise on the Glanders. These were at first communicated in the form of Memoirs to the French Academy, and published in their journals. They were afterwards collected, in 1754, into one volume, under the title of *Observations et Decouvertes Faits sur des Chevaux*, or Observations and Discoveries on Horses. We shall have occasion, in future parts of this article, to consider the merits of these memoirs, which were well received, and have contributed much to the advancement of Farriery.

The elder La Fosse also wrote some of the articles on Farriery in the Encyclopedia.

He was soon followed by his son La Fosse, the younger, who occupied the same important post as his father, and acquired much reputation by following his steps, and extending his improvements. He published, in 1766, his *Guide de Marechal*, or Farrier's Guide; a work well known in this country, though it has never, we believe, appeared in an English dress. It is divided into five parts, treating first, of the means of ascertaining the age of horses, and a succinct enumeration of the several parts; secondly, of the blunders and tricks of Farriers; thirdly, of the internal diseases of the horse: fourthly, of the external diseases, and, fifthly, the most important of the whole; of shoeing. This work is characterised by M. Vitet, as one of the most accurate, simplest, and most precise that had ever appeared.

The anatomical part of the work is short, but comprehensive, and is illustrated by some tolerable good plates. It appears to have been a sort of text book to a course of lectures on Farriery, which were afterwards, in 1772, published in a superb form, with sixty-five coloured plates, under the title of *Cours d'Hippiatrique*, or a Course of Farriery. The work is extremely scarce in Britain, where, according to Mr. Blaine, there are only three copies existing; one of which belongs to the Medical Society of Woolwich; another is in the hands of Mr. Mathias, a cidevant pupil of the Veterinary College;* and he believed Mr. Moorcroft has the third.

But the principal work of the younger La Fosse is his *Dictionnaire d'Hippiatrique*, in four volumes, which is little known in this country, and which we have not seen. Mr. Blaine calls it the best practical system of Farriery that had ever appeared.

In 1803 was published an Abridgment of M. La Fosse's Guide, of which an English translation has lately appeared, under the title of the "Veterinarian's Pocket Manual;" it is a useful little book, but it is a pity the author, or translator had not observed a more methodical arrangement.

Though, for the sake of uniformity, we have mentioned the younger La Fosse, immediately after his father, there were many works published in France, between the *Memoirs* and the *Guide*.

* We saw this sold at the sale of the late Mr. Mathias's effects, in 1822, to one of the medical booksellers, we believe for 18 or 20 guineas.—EDITORS.

In 1755 M. Garfaut, published his *Nouveau parfait Marechal*, an improvement on the *Parfait Marechal* of Solleysell. It is divided into seven treatises, on the conformation of the horse, on haras, or on the method of breeding horses; on stables; on the diseases of horses; on operations; on shoeing; and on horse medicines. This work is not without defects; but, for the most part, it is very good, and by no means deserves the brief character given of it by Mr. Blaine, in his *History of the Veterinary Art*.

The articles on Farriery, in the *Encyclopedie*, that had been written by Bourgelat and Genson, called forth a work from M. Rouden, sen. farrier to the larger stables of the King, who, in 1759, published *Observations sur les Articles de l'Encyclopedie concernant la Marechallerie*, they appear to be ingenious, and contain much practical information.

In 1763, there appeared at Paris, a work on Agriculture, in two volumes 4to. entitled "*La Nouvelle allaison Rustique*," which contains much useful matter respecting the breeding, management, and diseases of domestic animals, as well fowl, as quadrupeds.

The contagious epidemics among horned cattle, still appeared occasionally in France, and other parts of Europe; and many Essays on them, by various Physicians, particularly by M. Bouvard, of Besancon, in 1766, by M. Leclerc, and M. Barbaret, of Paris, in the same year.

In 1768, Daubenton, the celebrated naturalist, already mentioned, published a memoir on the mechanism of ruminations in sheep; and in 1769, appeared a small volume, entitled "*La Medicine des Betes a Laine*," or the Medical Treatment of Sheep.

Between 1776 and 1782 M. Vitet, a Physician at Lyons, published his "*Medicine Veterinaire*," in three volumes 8vo., of which the first contains a pretty full account of the anatomy of the horse and ox, with some judicious remarks on the beauties and defects of both; and on some of the more important operations to which they are exposed; the second treats of the diseases of horses, sheep, and cattle; and the third gives an account of the remedies in veterinary medicine, and ends with a copious analysis of most of the continental writings, and a few of the English, that had appeared on the subject from the time of Vegetius to 1770.

M. Vitet's work is, for the most part, a compilation from the best writers who have gone before him; but, as he had read much, and appears to have selected with judgment, his book is one of those which may be consulted with advantage. It is known to bear a high character in France, and is often quoted with respect. We are, therefore, disposed to rate it at a higher value than a late writer has done; and are inclined to suspect that some of those who affect to think lightly of it, are indebted to it for much more than the names of many of those who have written on this subject.

Much about this time, but in what precise year is not known, the Abbe Rozier, well known as the editor of the early volumes of the "*Journal de Physique*," published, his *Cours d'Agriculture et de Médecine Veterinaire*, a work of much reputation in France, but we believe little known on this side of the water.

Another work appeared about this period on the epidemics among cattle, entitled "*Recherches Historiques et Physiques sur les Maladies Epizootiques*," or Historical and Philosophical Researches respecting Epizootic Diseases, by M. Paulet. It contains an abridgment of almost all that had been written on the subject, and is particularly valuable for the account of the morbid appearances that were discovered on dissection.

After the death of Bourgelat and La Fosse, we hear of no character of any great eminence for some years; but it appears that since the first revolution the subject has again been diligently studied; and the names of Chabert and Huzard stand forward. Soon after, or about the time above alluded to, there appeared a considerable work, called the Rational Dictionary of Medicine, Surgery, and Farriery, in six vols.; and very soon after, a Veterinary Dictionary by Buchon. But it has no merit superior to that of La Fosse.

In 1787 M. Chabert published a treatise on the manége of horses; since which he has published on the peripneumonia of black cattle. There has also appeared an essay on the grease of horses, which gained the prize medal of the Society for the promoting the Health of Animals, to which is joined a report on thick wind and broken wind, but we are not aware who is the author.

In 1788 there came out a treatise on the Haras, with the method of shoeing, cutting, and all the lesser operations; translated from the Spanish of Hartmaun by Huzard.

Likewise instructions and observations on domestic animals, with remarks on the breeding, rearing, buying and selling, with an analysis of previous authors, by Chabert, Handriu, and Huzard.

The above authors have also published, conjointly, a Veterinary Almanack, containing the history and progress of animal medicine, since the establishment of the Veterinary schools.

In 1791, M. Lampagieu Lapole Veterinary Surgeon, published Observations on the Health of Animals in St. Domingo, dedicated to the Royal Veterinary College at Alfort.

In 1797, M. Chabert and M. Huzard published, by order of Government, a Treatise on ascertaining the Existence of the Glanders; the means of preventing, and destroying the infection.

But before we detail what has been done in Britain for the advancement of the art, we must take a cursory view of the principal writings that appeared during the eighteenth century in the rest of Europe.

In 1730, Goelicke, a German, published a treatise in 4to. "*De Lue Contagiosa Bovino*," or the contagious disease of cattle, in which the symptoms of the murrain that raged in Flanders about that period, are well described, and there are added the appearances on dissection.

In 1734, appeared at the Hague, a work entitled "*La parfaite Connaissance des Chevaux*," or the complete knowledge of Horses, by John Sannier, and Gaspard, his son. The latter boasts of this work, that it was drawn up from the Lectures of his Father, a man of experience, and that it contains the results of numerous experiments on subjects of every description, and diseases of every species; that it is the labour of the life of two men, the offspring of their continual application and study. After all their boasting, however, the works of Messrs. Sannier are little worth.

In 1745 and 1746, appeared two other treatises on the Epidemic of Cattle, by Manchard and Ens.

In 1749, the illustrious and indefatigable Linnæus published at Upsal, his *Pau Succius*, in which there is but little matter relating to this subject, if is excepted, a table of such plants as are eaten or refused by the domesticated animals, which is curious and useful.

Some time before 1756, Frederic Hastfer, a Swede, published instructions for improving the breed of sheep, which was in much repute, and was translated into French.

In 1762, M. Regnier, of Lausanne, published a Treatise on a contagious inflammatory disorder that raged among Horses and Cattle, and which the Genoese called the *lorwet*.

In the same year, there appeared at Vienna, a work on the Epidemic of Cattle, by Dr. Pleniz, and in 1765, Michael Sagard, of the same city, published a work on a contagious distemper that the year before attacked the cattle in the Circle of Iglau, in Moravia, and was attended with an appearance of an aphthous thrush in the mouth,

To be continued.

PATHOLOGY.

“ Without a correct knowledge of the origin and nature of Diseases, all remedies applied for their cure, may be deemed empirical.”

ON THE NATURE, CAUSE AND TREATMENT OF SPLINT.

BY MR. CHARLES LEWIS, V. S.

To the Editors of the Veterinary Examiner.

GENTLEMEN,—I take the liberty of forwarding a few observations on the nature, cause, and treatment of Splints, should you deem them worth a place in your forthcoming Journal, I shall feel gratified by their insertion.

I remain, your's obediently,

CHARLES LEWIS.

116, Gt. Titchfield-street, Nov. 10, 1832.

Splint is what is termed by the farriers, a species of exostosis, and is situated generally speaking about some part of the carpal and metacarpal bones, or in other words in some part between the knee and the pastern, generally on the inside of the leg. Dr. Bracken, one of the oldest and in some instances, one of the soundest writers on Farriery, states, that it derives its name, from its seeming to give strength to the bone, in the same manner as small splints of wood, are to a fractured bone. When the splint is attached to the skull itself, we find it denominated by the older farriers osselet, and when there are two osseous enlargements found approximating each other, they gave them the name of *fuzee*.

Thus much for the definition of Splint, but as Mr. Per-

cival very justly remarks, it very little elucidates the true nature of this disease, inasmuch, as the essential character of the affection is omitted, for unless the elastic substance joining the small to the large metacarpal bone, is included in the disease, a scientific Veterinarian will not give the name of splint to an exostosis, although to an inexperienced eye, it may appear to be in the precise situation of one. "A Splint in truth, observes the same excellent writer, is an *ossification of the cartilaginous-ligamentous substance uniting the small to the large metacarpal bone.*"

It is more generally found to occur in young than in old horses. Veterinarians usually consider the consequences of a Splint as chiefly depending on its situation, and in general this is correct; but according to Mr. Blaine, a Splint may prove painful and otherwise injurious, even though it should not interfere with any tendon or ligament; for independent of the increased sensibility of the bone itself when suffering under inflammation, the periosteum surrounding it being of an elastic nature, and having no yielding powers, must of course become stretched.

Now though, in its natural state, its sensibility is but small, yet under these circumstances it proves very considerable, and hence becomes a source of great pain to the unfortunate animal, until it has either become absorbed, or has burst. However, as the inflammation is never very acute, and the increase is generally very slow, thereby enabling the periosteum to accommodate itself to the distension; so more generally, when a splint is not situated beneath a tendon, very little uneasiness is created, and neither does it often cause lameness. But when it is differently placed, and does interfere with the motion of a tendon, or any important ligament, it is easy to conceive that it must then as a matter of course occasion pain, and produce lameness: for a ligament so pressed on loses its pliancy, and if a tendon passes over a splint it must excite inflammation of its theca or sheath, which being stimulated to secrete coagulable lymph, between its surface and the tendon, must obstruct the proper motions of such tendon, and thereby occasion lameness.

Having described the nature of this malady, I now proceed to point out the cause;—owing to some circumstance, inflammation is excited, and the consequence of which is like most of the other tissues when morbidly affected, are disposed to take on the power of secretion, so in the present instance, there is a disposition to ossification, and thus a nidus for the secretion of bone is found,

which is deposited in a similar manner to the absorption of cartilage, and the formation of bone in the young subject; so that the parts no longer are naturally separated, but a consolidation takes place, and it forms apparently one and the same bone.

Were the disease to stay its progress here, as is occasionally the case, it would never be detected in the living horse; but generally in consequence of a morbid action in the vessels of the periosteum, a circumscribed tumour is found, similar to what the ancient (and even some of the modern) human surgeons, erroneously designated by the term *callus*, analogous to that secreted between the fractured ends of bones, which becoming a bed for the osseous matter, is subsequently deposited; therefore, this is the reason why Splints are deposited externally.

The medium of our information of this disease, is the appearance of the exostosis, yet it is by no means essential to the existence of a Splint; for in old horses, it not unfrequently happens that the whole of the adventitious matter becomes absorbed; and it is a very common expression among unscientific farriers and grooms—" *that the Splint has worn away.*"

But Mr. Percival, remarks, "we know, that these animals are no more free from Splints than they were before the tumours disappeared; for unless the original elastic texture of the uniting material of the metacarpal bones be restored, a process incompatible with the laws of the animal œconomy, a Splint *can never be eradicated, a Splint never was, nor ever can be radically cured—once a Splint, always a Splint.*"

I now come to the treatment of Splint, and have to regret my inability to point out any method by which the disease can be eradicated. The only mode of practice I can recommend is that which the older farriers employed, and which the moderns still sanction, and among the veterinary writers of the present day, Blaine and Percival stand the foremost.

A Splint even without lameness, is frequently considered an eye sore, and in consequence we are often called upon to remove it, even when they are seldom perceptible but by the feel. When blisters are unsuccessful, then firing or the actual cautery may be applied, but we rarely find this necessary; however when it is necessary, it should be done in a lozenge form, and a blister to be instantanely applied after the operation.

Many authors have recommended the division of the

periosteum for the cure of this disease, but it has been found to answer no good purpose, our best practical Veterinarians have very properly abolished it. Caustic has also been employed, as also a barbarous operation of making an incision, and chipping off the Splint, with a mallet and chisel, but this very frequently, as might be expected, produced incurable lameness.

However, observes Mr. Blaine, when the Splint, forms a prominent tumour, it might possibly be laid bare, and removed with a very fine saw. This could be proper only under very peculiar circumstances, as where the swelling protruded very much, and occasioned great blemish: of course, when its situation is among the ligaments, let it be ever so prominent, this must always be improper.

For the removal of this disease, Mr. Blaine, recommends the friction of two drachms of mercurial ointment, after which the application of the mercurial blister,* and when the parts are healed, the blister again to be applied, in order that the absorption may be effectual.†

AN ENLARGEMENT OF THE RIGHT TESTICLE OF A HORSE.

BY MONS. JACOB, OF TOULOUSE.

A fine Stallion, had been for a considerable length of time, labouring under a chronic enlargement of the right Testicle, the left having become at the same period greatly decreased in size. The former was extremely irregular on its surface, and hardened, which led Mons. Jacob to suppose that it was a sarcocoele.* Accordingly this gentleman had recourse to the following method of treatment, and which proved successful: forty leeches were applied to the scrotum, and subsequently a large linseed meal poultice; this was frequently repeated, and after a fortnights rest, the enlarged testicle was well rubbed with an

* The Mercurial blister is composed of four ounces of the common blister, and half a drachm of finely powdered corrosive sublimate.

† Our readers will perceive that the above paper, our Correspondent has abridged chiefly from the Works of Blaine, Percival, &c., yet as it well defines the nature and cause of the disease, we have inserted it.—Eds.

* By a Sarcocoele, we mean a disease of the body of the Testicle, consisting in general of such an enlargement and alteration in its structure, as to produce a resemblance to a hard fleshy substance, instead of that fine, soft, vascular texture, of which in its natural and healthy state it is composed.—Eds.,

ointment composed of the hydriodate of potass, the size of a small nut being at each time employed. After this was continued for seven days, it was left off, in consequence of the intense pain it produced, to alleviate which poultices of an emollient nature were applied. When the irritation from the iodine had subsided, the testicle was found decreased to one third its former size; and the frictions were again resorted to, with the administration internally of iodine with opium, extract of juniper berries and gentian. The latter medicines were continued by M. Jacob from the 8th to the 25th of August, 1829, at which period there remained no enlargement of the right testicle, and strange to say, the left had increased to its original size. This case is highly important in a practical point of view, inasmuch as it proves to the profession the specific power that iodine exhibits over the glandular tissue, and especially when morbidly affected.†

PROFESSOR DEWHURST'S PHYSIOLOGICAL LECTURES.

1. *The Circulation of the Blood, and its Vessels.*

(*Concluded from page 12.*)

The longer duration of action in the right than in the left cavities of the heart, is to be ascribed solely to the circumstance of the former parts continuing to receive blood, after the latter are completely evacuated. Hence, if an experiment be instituted, in which these conditions shall be reversed; the prerogative of the *ultimum moriens* will be transferred to the left cavities. Haller has produced this effect; he opened the *venæ cavæ*, pressed out the blood from the right cavities, and tied those veins. He made a large aperture in the pulmonary artery, in order to evacuate the contents of the right ventricle. The pulmonary veins were left untouched; but the aorta was tied. Thus the right auricle and ventricle were evacuated, whilst the blood was received and retained in the opposite cavities. By this means the right auricle and ventricle remained in action long after the contraction of the left cavities had ceased.*

It is hardly possible to determine the velocity of the

† From *Le Journal Pratique de Medicine Veterinaire*.

* See *Elementa Physiologiæ*, lib. iv. sect. 5. 6. 14.

blood's motion in the healthy state; for animals differ from each other in this respect, and considerable variety probably takes place in different parts of the body. It is generally supposed, that the blood flows in a more gentle stream through the small arteries than in the arterial trunks; and that the velocity of its current is somewhat less in the veins than in the arteries of the body. These differences have however, been exaggerated by former physiologists. The mean velocity of the blood in the human aorta is calculated at eight inches each pulsation, which gives about fifty feet in a minute. If we reflect that the systole of the ventricle, which gives this whole impulse to the blood, occupies one third of the whole pulse, the velocity of the blood's motion must be trebled in that division of the time. It is said that this velocity which we have assigned to the blood's motion at its departure from the heart, becomes speedily diminished in its further progress; and the diminution has been deduced from various causes. The first and most powerful of these is the constantly increasing area of the branches, when compared with the trunk of an artery.

It is a well known law in hydraulics, that the velocity of a fluid passing through an inverted cone constantly decreases, and that the diminution of velocity is in the ratio of the area. The mathematical physiologists have also noticed the effects of friction, deducing these from a comparison with the course of fluids in dead tubes. Other causes have been deduced from the same source; hence the serpentine course of some arteries, the unfavorable angles by which they sometimes arise, and their communications with each other are enumerated among the circumstances which retard the course of the arterial blood. But it must be remembered, that in viewing these retarding causes, we are considering their action on the blood, as if this fluid were contained in inanimate tubes, and influenced merely by the contraction of the heart, without taking into account any accessory impulse, which may be, and most probably is, derived from the arteries. This retardation has been variously estimated by different calculators, who have all made it very considerable. Dr. Hales supposes the blood to flow through all the capillary arteries of a frog, at the rate of two thirds of an inch per minute, which will be about 650 times slower than in the human aorta.* Drs. Robinson and Whytt have gone still farther: the former stating that the velocity of the blood's motion in the

* Statistical Essays, vol. ii. 66.

aorta, is to that in the smallest vessels, as 1,100 to 1.† I merely mention these calculations to shew what absurdities have been committed by men of the greatest abilities, when they have applied the laws which regulate the properties of dead matter to the living functions of the animal machine. Haller's "Observations on the Circulation in living Animals," entirely overthrow these calculations.‡ He found by his microscopical experiments that the blood flowed generally as rapidly through the small as through the larger vessels. He also states, that in living animals it is poured out as fast from a small, as from a large artery. The numerous and diversified experiments of Spallanzani, afford additional evidence of the same truth, and throw considerable light on the whole subject. The results of his experiments are so conclusive, that I present them to the reader in his own words. "I did not find that the blood, in passing out of the middle-sized arteries into their branches, experienced the least retardation from any difference in the capacity of these vessels, or the numerous angles which are formed with one another; neither did the mode of the circulation, whether languid or strong, oscillatory or intermittent, appear to be at all affected by the multiplicity of natural and artificial curvatures, or the flexures and convolutions made by the different ramifications. When the strength of the animal was not impaired, the blood in the small arteries moved very rapidly, and with nearly an equal velocity; but when, on the contrary, it had been exhausted, or in an unhealthy state, the circulation was carried on with the same celerity in the middle-sized arteries, whilst it began to abate in the small ramifications, and stopped sooner or later, in proportion to their distance from the heart." The united results of these experiments display, in a striking point of view, the true motion of the blood from the origin to the termination of the arteries, which was hitherto only conjectural, and subject to frequent disputes, from the want of a sufficient number of experiments. These facts, besides, confirm the sage maxim of Haller, respecting the caution with which we ought to apply mechanical principles to the animated system; for, in fact, if the animal machine be strictly subject to hydraulic laws, why do they not produce the same effect in the vascular system as in common tubes? Whilst, however, we acknowledge that these laws must exert an influence

† Dissertation on the Food and Discharges of Human Bodies.

‡ *Elementa Physiologiae*, lib. 6, sect. i. §. 30.

upon the phenomena of the circulation, we contend that their power is counterbalanced by the opposite causes, inherent in the sanguiferous system.

I have stated, that the blood is thrown into the arteries by separate contractions of the heart; yet these vessels are constantly full, as may have been proved by opening them during the heart's diastole. For the blood flows on in such a way, that the subsequent quantity discharged from the right ventricle, overtakes that which is before, and thus causes the pulsation of the arteries. The excess of velocity in the blood, coming from the heart, over that contained in the arteries, becomes constantly less; and at a certain point ceases altogether. Here the pulse ceases also. The motion of blood in minute veins, seems to be equal in velocity to its course in the small arteries; this velocity increases in the larger trunks; and there is a constant acceleration in the blood's course until it arrives at the heart. This fluid is passing through tubes which constantly decrease in area; and it follows of necessity, that by diminishing the channel of a fluid, its course must be accelerated. Hence the trunks of the *venæ cavæ* return to the heart, within a given time, as much blood as the aorta carried out of this viscus.

The motion of the blood along the veins must be derived from the impulse which it receives from the heart, and from the action (if there be any) of the arteries. Its circulation in these vessels is assisted by the contraction of the muscles, which must urge on the contained fluid toward the heart, since their valves prevent any retrograde motion. The return of the venous blood is affected by respiration. It appears in living animals that the large veins become turgid during expiration, either from the obstruction of the blood's course through the lungs, or in consequence of its reflux from the heart; they are evacuated in respiration. In this latter state the depletion of the veins causes the brain to subside; whereas in expiration the retension of the blood produces distension and swelling of the viscus.

As the motion of the blood in the veins is not derived from any immediate force, it is considerably affected by gravity, in spite of the valves which counteract this influence very considerably. The experiments of Haller and Spallanzani have shewn this fact in cold blooded animals. It is evinced also by various phenomena in the human subject; viz. varices of the legs, swelling of the feet after the position has long been preserved, &c.

Some very curious and interesting phenomena have been

observed in experiments on living animals, and referred to a general principle termed derivation; in conformity with which it appears that the blood flows rapidly towards any quarter from which the usual pressure is removed. The experiments of Haller and Spallanzani have much illustrated this subject, which is of the greatest importance in a practical view.* The blood rushes from quarters towards an incision in a vein or artery; it forsakes the neighbouring trunks and branches; it is discharged both in the direction of the circulation, and in a retrograde course; it moves against the force of gravity, as well as contrary to its usual current. When the blood stagnates in an animal submitted to experiment, it flows again through an opening made in an artery or vein. The blood in the artery corresponding to the vein that is opened, recovers or accelerates its course according to the stagnation or velocity which it possessed before the operation. An incision into the heart has the same effect, the blood flows out at the opening both from the arteries and veins. The swelling of a part under a cupping glass is probably derived from the principle which we have now described.

When the circulation ceases before death, it appears to stop in the small vessels, and this stagnation is propagated towards the heart. "The arterial blood," says Spallanzani, in speaking of the phenomena of languid circulation, "which at first had a uniform course, lost more or less quickly its equilibrium, and abated in velocity in each diastole of the heart; to this abatement soon succeeded a complete stagnation, except during the systole, when the blood preserved some remains of motion, which however disappeared by degrees. Thus the circulation ceased in the arteries by a successive and gradual diminution of momentum, without any flux or reflux, intermittent or vibratory motion. The motion of the blood in the veins ceased in the same gradual manner; and these different phenomena were alike evident in the arterial and venous fluid of cold and warm blooded animals.

It has been stated that the globules of the blood pass more in the axis of the vessel than the other parts of this fluid. This circumstance has been deduced from an absurd application of the laws of hydraulics to the circulation, and is not founded on any actual observation in living animals.

* See Haller's *Elementa Physiologiæ*, lib: 6. sect. § 40; Spallanzani's *Experiments on the Circulation*, &c. p. 386, et-seq.

It appears also, from experimental inquiries on the subject, that we are not warranted in assigning to the blood any intestinal motion, in addition to the regular and uniform progression which we have been now describing. Yet it is not unlikely, that the various directions, divisions, and inosculation of the blood-vessels may have some influence on the elements of the blood.

I proceed now to consider the powers which animate the organs of circulation, and enable these parts to execute their several functions. Those of the heart, as being of the greatest and most important, claim our first attention; but there are secondary and auxiliary forces, which probably have considerable share in aiding the actions of this viscus.

It can readily be perceived that no certain calculation can be formed of the powers of the heart, when we consider that neither the quantity of blood expelled at one pulsation, nor the distance through which it passes in a given time, nor the velocity of its course, can be defined with any certainty; much less can an accurate estimate be formed of the obstacles which occur to the blood's motion, which must affect considerably such a calculation.

We may, however, approach in some degree to the truth, by collecting and comparing the results of probable conjecture. If we calculate the blood contained in the human body at thirty pounds, the number of pulsations in one minute at seventy five, and the quantity expelled from the left ventricle at each pulsation at two ounces and a half,* the whole quantity will pass through the heart about twenty three times in the course of an hour, it will perform the circulation once less than three minutes. The velocity with which this blood is propelled by the systole of the left ventricle may be collected from the violence with which it is ejected from a wounded artery, and the altitude to which it ascends.

Blumenbach has seen it projected more than five feet from the carotid of an adult, during the first contractions of the heart. Our countryman, Hales, calculated from his experiments, in which he measured the height of the blood's ascent in a glass tube, inserted into a large artery, that it would be seven feet and a half from the human carotid: he estimates the surface of the ventricle at fifteen square inches; and thus finds that 1350 cubic inches, or 51lb. weight press upon the left ventricle, and must be overcome by its systole.

* Salmon's Ar. Anatomica.

Many other calculations of the powers of the heart have been formed upon mathematical principles; but different persons have led to such opposite results, that we are warranted from this circumstance in disregarding them altogether. Borelli makes the power of the heart equal to 180,000lb. Keill to eight ounces. Senac observes, that if a weight of 50lb. be attached to the foot, with the knee of that side placed on the opposite one, the weight will be elevated at each pulsation: this weight is placed at a considerable distance from the centre of the motion: and allowing for this circumstance, he estimates the moving power at 400lb.

This power of the heart, so wonderful both in extent and duration, must be referred to the irritability of the organ; in which point of view it seems far to exceed all other muscular parts of the body. That the immediate cause of contraction in this viscus arises from the presence of blood in its cavities, is shewn by the celebrated experiment of Haller; in which the longer duration of action in the left or right cavities was varied by influencing the supply of blood.

The action of the heart is intimately connected with the changes which the blood undergoes in its passage through the lungs: for when respiration is obstructed, the heart's action ceases; and it may be recalled by again introducing air into the lungs.† Hence arises the importance of inflating the lungs in instances of apparent drowning, &c. in order to excite the heart to action.

The other organs of circulation, besides the heart, are endowed with powers by which they contribute to the performance of this function. The arteries probably contribute essentially to the circulation, although the degree of their assistance and their mode of action, are not satisfactorily explained. By their elastic power, these vessels recover their original size, after being distended by the heart's action, and they must of course urge on the blood proportionally. It is a fact most familiarly known, that the arteries pulsate and that powerfully. Physiologists have long been accustomed to ascribe to these vessels a state of systole, or contraction, and a state of diastole or dilation, which are considered as alternating with the similar states of the heart; and the latter of which is

† MS. Notes of Mr. Brodie's Lectures delivered at the Royal College of Surgeons in London, 1823.

referred to a muscular power, or irritability residing in the arterial coats.

It seems certain that the effect, which we call pulse, cannot be ascribed originally to any property of the vessel in which it occurs; but that its origin must be derived from the contraction of the heart, and the consequent distensions of the arterial tube by the blood, which is then expelled from the left ventricle. It is admitted, however, that a diastole of the arteries arises from the lateral pressure of the blood, and is forcibly projected into these canals. That this pulsation is produced by the heart's action, is proved by aneurisms, and by the effect of ligatures on the arterial trunk, for these destroy the pulse in the arteries beyond the part.

We are not equally warranted in ascribing a true systole to the arteries, or a contraction of these vessels by muscular power, to a smaller area, than they are reduced to by their elasticity. Nay, some physiologists have proceeded so far, as to deny altogether the existence of irritability in the arteries; or at least to affirm that the action of the heart alone suffices to carry on the circulation. The following arguments seem to prove the existence of muscular powers in the arteries, and the actual exertion in the living subject.

I have already shewn that the causes which would retard the blood's motion in dead tubes, do not seem to operate in the arteries of the body; this can only be explained, by supposing them to be overbalanced by some powers residing in these vessels. If we divide an artery in a living animal, the orifice closes; if we divide it for some extent, it contracts gradually, so as to become nearly shut.* The arteries of an animal bled to death are contracted to a smaller area than their elasticity would bring them to, and they may at least be distended considerably, and will not by their elasticity recover their former contracted state.* The functions of the arteries argue the possession of living powers: by these the growth and formation of various parts of the body is affected; they perform the different secretions. These phenomena, as well as those of blushing and paleness, cannot be accounted for, if we consider the arteries merely as dead tubes. The

* Hunter on the Blood, p. 114.

* Kirkland on the present state of Medical Surgery, vol. i. p. 306. et. seq.

great supply of nerves which these vessels possess in many parts of the body, viz. the branches of the carotid, the arteries of the neck, and those of the chest and abdomen, is presumptive of the same effect. In some rare instances the heart has been wanting in foetuses, otherwise well formed, we must suppose that there was a circulation which must, under these circumstances, have been carried on in the vessels only. It has been stated, in opposition to the irritable power of the arteries, and to their systole as aiding the circulation, that stimuli which affect other muscles, cause no signs of irritation in these tubes. That an artery laid bare in the living body, cannot be seen to contract; that if divided, its diameter is not lessened in the supposed state of systole; that the blood flows in a continuous stream, excepting as far as it is affected by the heart's action.*

Hence Blumenbach states it as his opinion, that the arteries do not contract in the healthy state, or as long as the heart is adequate to the natural performance of its functions; but if these vessels are affected by the preternatural stimuli, or if the heart's action from whatever cause, become deficient, then the vital powers of the arteries will serve as an auxiliary force for keeping up the circulation.†

Lastly, all observers agree in stating that the blood flows in an uniform current through the smaller ramifications; and it has generally been allowed, that this is the case in all arteries of less than one sixth of a line in diameter. Now I should infer from reasoning *a priori*, as Mr. Hunter has actually affirmed, that the muscular force of an artery would increase in a direct ratio with the diminution of its size, for the auxiliary power must be the more required, in proportion as we recede from the source of motion. But if either these small arteries, or the larger ramifications which immediately precede them, contribute to the circulation by any actual contraction, the blood's motion could not appear regular and uninterrupted. These which appear to be the principal arguments on both sides of the question, I leave to your consideration.

Some physiologists, being of opinion that the action of the heart could not reach to the smaller order of sanguiferous

* Blumenbach Inst. Physiol. sect. 7. § 130.

† Hunter on the Blood. p. 122.

vessels, have ascribed the passage of the blood in the minute arteries, and thence into the veins, to an oscillatory motion of these parts, and have employed this, as the doctrine of inflammation. Microscopical observation, however, detects nothing but an uniform progressive motion in the small vessels. There is little to be said respecting the powers which belong to the veins, since these vessels obviously take a less active share in the circulation than the other parts of the system. The return of the blood through the veins is only effected by the pressure from behind of the arterial blood, assisted by the valves, which prevent any retrograde motion.

PATHOLOGICAL ANATOMY.

"A knowledge of Morbid Anatomy, is the sheet anchor in ascertaining the symptoms of disease."

Description of the Morbid Anatomy of the larynx in a Horse, By WILLIAM GOODWIN, ESQ., Veterinary Surgeon to His Majesty.

The horse from which the larynx in this case, was removed, had been for many years driven in one of His Majesty's carriages, and when in harness had been accustomed to have his head placed in an unnatural position, and had become what veterinary surgeons call a roarer, so named from a peculiar noise the animal makes in expiration, but which is produced by different causes in different instances. In this case the whole of the muscles on one side of the larynx were found more like thin ligamentous bands than muscles, there being no vestige of the muscular fibres remaining. Whilst on the other side these muscles were in a perfectly healthy condition. The arytaenoid cartilage on the diseased side was very much shrunk, which along with the wasting of the muscles preventing the natural ingress and egress of the air, during respiration, thus satisfactorily accounted for the roaring.

ZOOLOGICAL ANATOMY.

"Next to the Anatomy of the Man, there is no study more worthy the attention of the philosopher, than a contemplation of the structure of those animals by whom we are surrounded."

Notes on the parts of the Viscera Skeleton of the Chin-chilla Lanigera. Read before the Committee of the Zoological Society.

By WILLIAM YARRELL, ESQ. F. L. S. &c.

THE VISCERA.

The lungs are composed of three small lobes on each side. The heart is flattened in from behind forwards, measuring six-tenths of an inch across its base, and but four-tenths in depth; the want of an *apex* gives it a rounded and muscular appearance. The liver exhibits two large and equally sized lobes, and two smaller lobes. The stomach, a single cavity, measuring from the entrance of the *œsophagus*, round the great curve to the pyloric contraction, five inches eight-tenths; the greatest breadth two inches two-tenths, the depth one inch four-tenths; the spleen is small and elongated. The length of the small intestines, from the *pylorus* to the end of the *ilium*, three feet ten inches; the *cæcum* and first portion of the *colon* are of large size, made up of three half circular convolutions, one central, with one of larger dimensions on each outer side, containing numerous cells and divisions, strengthened by muscular bands and *septa*; the whole length of the *cæcum*, *colon*, and *rectum*, measures four feet ten inches. With the exception of the *cæcum* and commencement of the *colon*, which, as I have stated, are voluminous, all the intestines are of very small calibre. The kidneys vary somewhat in shape; one measures five-tenths of an inch in length, and three-tenths in breadth, that on the opposite side is much more spherical. The specimen examined was a female, and the uterine *cornua* measured each, three inches and a quarter in length.

THE SKELETON.

When mounted, the whole length from the nose to the end of the tail, is thirteen inches six-tenths, the upper surface of the cranium, from the occiput to the inter-orbital space, is in form triangular and flat, the width of the occiput one inch one-tenth; of the inter-orbital space, four-tenths; the whole length of the head two inches two-tenths; the mastoid processes and auditory cells of very

large size ; the external *meatus* also large, oval, directed upwards and backwards ; the *zygoma* narrow and slender posteriorly, but deep and stronger at its junction with the malar bone, which has an ascending bony division between the orbits and temporal *fossæ* ; the nasal bones, are narrow, convex, and of parallel diameter ; the lower jaw is curved, broad, and strong ; the course of the *incisor* teeth is visible, and the alveolar cavities of the molar teeth are well defined externally ; the coronoid processes wanting, apparently, as if broken off during the preparation of the skeleton, but have obviously been of small size ; the condyle elongated from before backwards, the plate deep, and the posterior angle of considerable length. Dentition, $\frac{2}{2} \frac{2}{2}$ the exposed position of the *incisors* measures four-tenths of an inch in length ; the molar teeth are all made up of parallel portions of bony *lamina*, each portion invested with a thin coat of enamel and closely united, the base of a molar tooth presenting six lines of enamel, and three cavities ; the anterior third of the first molar tooth on each side, above and below, is smaller than the other two portions, and gives an increase of surface to these also ; in the molar teeth of the lower jaw, the fold of enamel between the first and second portions of the bony *lamina* of each tooth does not reach quite to the outer edge, and the two portions of bone, therefore, appear to be only partially separated. The direction of the parallel *lamina* of all the molar teeth is, not at right angles with the line of the maxillary bones, but inclining obliquely from without backwards.

The length of the *atlas* to the end of the tail is eleven inches four-tenths ; the cervical vertebræ are 7 : dorsal, 13 ; lumbar, 6 ; sacral, 2 ; and caudal, 23. The *scapulæ* are small, measuring one inch from the external angle to the articulation with the *humerus*, the spine is but little elevated, the *acromion* ample ; the clavicles perfect ; the length of the *humerus* one inch two-tenths, the bone strong and furnished with an elongated crest, descending from the head ; from the *olecranon* to the carpal articulation, one inch six-tenths ; the ulna and radius firmly anchylosed throughout the distal half of the length ; thence to the end of the longest of the five toes eight-tenths of an inch. The ribs thirteen pairs.

The bones of the pelvis are slender and elongated ; from the crest of the ilium, which is but little produced, to the inferior edge of the *os ischium* is one inch nine-tenths ; the *ossa pubis* is slight in structure, advancing but little, the

symphysis elongated, and the obturator *foramen* of large size. The *femur* is straight, strong, and smooth, and measures one inch eight-tenths; the *tibia* two inches two-tenths; the *fibula* is complete, and forms the external *malleolus*; from the *os calcis* to the end of the longest toe, two inches one-tenth; the toes, four in number, of which the outer ones are the shortest, the third from the outside the longest, the second and fourth equal.

The resemblance of the skeleton of the *chinchilla* to that of the *jerboa*, is also remarkable, particularly in the form of the head, in the excessive developement of the auditory cavities, and the small size of the anterior extremities compared with the hind legs.

The *chinchilla*, which has been long known in commerce on account of its fur, but only recently made known to science, was described as the type of a distinct genus, under its common name, by Mr. Bennett in 1829, and by Mr. Gray, in August, 1830. Its true characters seems even now to be unknown to the French authors, who appear to be acquainted with its skin alone, and never to have examined either its teeth or the number of its toes. In these respects it deviates from the characters of their proposed genus, a genus which cannot be adopted, inasmuch as it is composed of heterogeneous materials, and as the two types, included in it have both previously been described and designated as distinct groups, and appeared closely allied to Mr. Joshua Brooks's new Genus *Lagostomus*.*

VETERINARY ANATOMY.

"Anatomy and Physiology form the foundation of all Veterinary knowledge."

The Anatomy of the Absorbent System in the Horse.† By WILLIAM PERCIVAL, Esq. M. R. C. S., Veterinary Surgeon to the 1st Regiment of Life Guards. And PROFESSOR GIRARD, of the Royal Veterinary College, Paris.

Definition.—The absorbents constitute that system of vessels, which are employed in absorbing alimentary and other matters, and conveying them into the general circulation.

Division.—These vessels were, when first discovered, supposed to exist of different kinds in the body, hence the

* The reader will find an excellent paper by this venerable and talented Zoological Anatomist, inserted in the *Transactions of the Linnean Society*, 1829, wherein the system of Dentition and Osteology of this genus, are treated in detail.—EDITORS.

† Extracted from the author's work on the Anatomy of the Horse, p. 265. Reviewed in our last Number, vide p. 36.

appellations *lacteals* and *lymphatics*. It is now, however, ascertained that they exhibit no difference whatever in their anatomy, and also that although the lacteals are ordinarily employed in absorbing chyle from the intestinal canal, they are equally with the lymphatics, capable of taking up other matters. The only natural division they appear susceptible of, is into *superficial* and *deep-seated absorbents*. The former are distributed in great numbers immediately beneath the skin, and perforate it through almost every point; the latter are commonly found ramifying in company with the trunks of the blood vessels, more especially with the veins.

Peculiarities.—The absorbents are so minute as to bear no sort of comparison with the blood vessels in point of magnitude; to make up for this, however, they are in general vastly more numerous, and frequently anastomose. They also exhibit peculiar tortuosities in their course, and are every where beset with valves.

Glands.—The absorbent glands are small, oval-shaped bodies, varying in magnitude from a pea to a walnut, found in many unexposed parts of the body along the course of the absorbent vessels. Generally speaking, they exhibit a reddish hue, but there are some that assume a dark blue, and even a black complexion; they exist mostly in groups or clusters, rarely solitary.

Communication.—The superficial and deep-seated vessels communicate very frequently with each other, and never fail to send off in addition other anastomotic branches, to whatever solitary absorbents there may be in the vicinity. The glands, likewise, are linked together by absorbents, tubes of intercommunication running from one to the other.

Demonstration.—The following different methods of proceeding, with a view to demonstrate these minute and ordinarily hardly visible vessels, are extracted from the laborious and accurate remarks of the late celebrated Anatomist, Mr. Cruikshank. In an animal opened alive, some hours after it had been fed, the lacteals are seen turgid with chyle; they may also be made visible by throwing their exuded fluids into the intestines, or by making ligatures in the trunk of the anterior mesenteric artery, which will include the trunk of the absorbents.* An

* PROFESSOR DEWHURST, when in Greenland in 1824, witnessed the *Lacteals* beautifully displayed in the mesentery of the *Trichecus Rosmarus* or Walrus—*Moenedon Monocerus* or Narwhal, the *Ursus Borealis* or Polar Bear, and the *Phoca Greenlandica*, or Greenland Seal—they were filled with chyle, and appeared to take a similar course to the anterior Mesenteric Artery.

eye accustomed, readily distinguishes lacteals upon the intestines from the arteries and veins, even when they are empty and collapsed; punctures with a lancet, and the vessels injected with quicksilver by means of a tube formed expressly for that purpose. I have sometimes injected lacteals from punctures made by the sides of veins, where I knew they must be, though then invisible to the naked eye.

Upon the liver and lungs, lymphatics are frequently visible, and may be injected by puncturing one of the small branches, but the valves generally make the injecting of them from the trunk to the branches impracticable. Pressure in the course of the absorbent circulation will commonly force from the extreme branches, into the trunks, some little reddish or brownish fluids, making the latter visible, which may then be punctured and injected with watery fluids thrown into the arteries, veins, or ducts of glands, get into the absorbents, and render them visible. One of the best methods is to previously inject the arteries and veins of the part, and afterwards macerate it for some days; putrefaction then takes place, air is generated in the cellular membrane, whence it gets into the orifices of the lymphatics, and uniformly fills their branches. The best subject for these injections is one whose limbs are without fat, and dropsical, but not too much so.

In parts where glands are to be found, it is only necessary to puncture the gland, and introduce a tube filled with quicksilver, or push the pipe into its substance without any previous puncture. The mercury thus fills the cells of the gland, and from these the lymphatics. The thoracic duct itself is most successfully injected in the same way that is either from glands upon the mesentery, upon the bodies of the lumbar vertebræ, or those upon the inside of Poupart's ligament. When vessels are injected, and resemble lymphatics very much, the best method of determining whether or not they are lymphatics, is to trace them to the nearest lymphatic of the glands; if they terminate in them in the usual manner, they are lymphatics.

No English Veterinarian, to my knowledge has, up to present day, been at the pains to demonstrate practically, the particular distribution of the absorbing vessels of the Horse; we have hitherto travelled onward *analogically*, and so should we have continued to do, had not our French professional contemporaries furnished us, as well as themselves, by their praiseworthy exertions in the cause of science, with materials to fill up this lamentable hiatus

in Veterinary Anatomy. Professor Girard, whose *Traité d'Anatomie Veterinaire* does no less credit to the talent and industry of its author, than honour to the Veterinary school over which he presides, has presented us with an article on the ramifications of the lymphatics, which I shall translate and introduce in this place.

THE THORACIC DUCT*

Is the largest, the longest, and most remarkable of the lymphatic vessels, in which terminate the majority of the lymphatics of the body, it is situated within the thorax, on the right side of the dorsal vertebræ, between the aorta and the vena azygos; it receives the lymphatics from the posterior extremities, pelvis, parietes, and viscera of the abdomen, head, neck, withers, and left anterior extremity. It takes its origin under the loins in a dilatation or sinus, very variable in its form and dimensions, situated at the root of the great mesenteric arteries, named the *Receptaculum chyli*; it directs its course forward; enters the thoracic cavity by the aortic foramen of the diaphragm, extends along the bodies of the dorsal vertebræ, until it arrives opposite to the base of the heart, where it curves downward to cross it over to the left side, in its way to the anterior opening of the thorax; and, as it leaves the spine for this purpose, it runs obliquely over the trachea and œsophagus; having reached the left side, it stretches forward to the anterior vena cava, and terminates, against the middle of the anterior border of the left first rib, in the base of the left axillary vein; not unfrequently it ends in the right axillary; in some instances, even in the commencement of the anterior cava. At its termination, it dilates and forms a sinus, whose mouth opening into the vein, is guarded by a broad valve so disposed, as to pre-

* Eustachius, a Roman Anatomist, was properly the first discoverer of the absorbent system. It appears, that about the year 1563, he saw the thoracic duct, or what is now known to be the trunk of the absorbent system, in a horse: he has described it in his *Treatise de sine Pari*, where he calls it *Vena Alba Thoracis*, and from which it is impossible to doubt his having seen the *Ductus Thoracicus*; but, not understanding it, he commences at its termination in the left subclavian vein, and traces it towards its origin, where it is no wonder that he was bewildered, since the art of injection was not then discovered; and, as will be afterwards seen, hardly any of his successors had any clear ideas on this subject, until the time of Assellius.—EDITORS.

vent any reflux of blood into the duct;* it has also a ligamentous band round it at this part, which confines it to the vein receiving its contents.

This canal shows but little uniformity in its calibre: in some places it is straight, in others varicose. It is not uncommon to find it detaching several branches in its course, large and small, which either remain separate, or else, after running a certain distance, rejoins the main channel.

THE RECEPTACULUM CHYLI.

This reservoir forms the point of general confluence of all lymphatics of the posterior limbs and abdomen, and that from which originates the thoracic duct: it is maintained by the aorta on one side, and vena cava posterior on the other, and is formed by the union of five or six large lymphatics, of which two or three come from the entrance of the pelvis, two or three others from the mesentery, and a single one from the environs of the stomach and liver.

The Professor here makes a classification of all the lymphatics of the body,† into those of that proceed to the abdominal, and those that run into the thoracic portion of the duct.

I. LYMPHATICS DISCHARGING THEIR CONTENTS INTO THE ABDOMINAL PORTION OF THE THORACIC DUCT.

1. *Lymphatics of the Posterior Extremities.*

These are distinguishable into the superficial and deep-seated. The first originates particularly from the skin and subcutaneous cellular tissue. They form divers ramifications, which accompany the superficial veins, of which the most remarkable attend the vena saphena major, frequently anastomosing with one another, and forming altogether an anastomic net-work; all these lymphatics

* Notwithstanding this valve, blood often gains admission into the canal; this is observable in all cases of sudden death, or in the struggle and convulsions attending expiration.

† About the year 1634, Bartholine, a Dane, and Olaus Rudbeck discovered the lymphatics. They were also noticed, for the first time, in this country, by Dr. Joyce, who was then taking his degree at Cambridge, in 1653. John Hunter discovered them in geese. Mr. Hewson demonstrated them in birds, turtles, and fishes, in England; and Dr. Monro, in Scotland, about the same time laid claim to the latter. Bartholine, however, saw them in the globe fish.—EDITORS.

run to the subcutaneous original glands, which are lodged upon the superior and anterior part of the thigh.

The deep-seated lymphatics take their rise from the foot, ascend along all the plantar veins, continue upward among the muscles, in company with the deep-seated veins, corresponding in their principal divisions to those vessels, and proceed to the inguinal glands. All the lymphatics of the posterior limbs assemble at these glands, and here form a plexus, from which large branches depart and traverse the iliac glands, clinging to the sides of the iliac vessels, and discharge their contents into the pelvic branch, contributing to the receptaculum chyli.

2. *Lymphatics of the Pelvis.*

The vessels coming from this cavity run, in part, to the inguinal glands, and in part to the internal pelvic glands, the superficial lymphatics about the pubes, and at the outlet of the pelvis they run and join those of the extremity; those of the perineum and anus enter the cavity, and are accompanied by those coming from the croup and tail, both proceeding to the glands within the interior of the pelvis.

All the deep-seated lymphatics accompany the veins, make for the pelvic glands, form union with the others, and run and empty themselves into the main pelvic branch, wherein their lymph mixes with that coming from the inguinal glands.

The lymphatics of the urinary and genital organs included in the pelvic cavity, also traverse the glands lodged therein, and unite with those of the parietes of the pelvis. Those of the scrotum enter the inguinal glands, as also do those belonging to the sheath and penis. The ramifications derived from the testicle and spermatic chord take the course of the veins, and penetrate one or two of the lumbar glands lodged at the entrance of the pelvis.

The lymphatics of the mammæ which are also divisible into superficial and deep-seated, run to the inguinal glands, and anastomose with the superficial set belonging to the inferior parieties of the abdomen; but before they reach these last glands they pervade those of the mammæ.

(To be concluded in our next.)

ESSAYS,

On the Structure and Economy of the Horse's Foot.

BY HENRY BRADDON, ESQ.

"An intimate acquaintance with the Structure, Economy and Pathology of the Horse's Foot, should constitute the most important feature in the studies of the Veterinarian and Student."

(*The Hoof continued from page 30.*)

In continuation of my last paper on the Foot of the Horse, I shall proceed in this, to describe the horny, sole; which is joined with the lower part of the crust, covering the inferior surface of the coffin or pedal bone. There is found between this horny sole and coffin bone, a vascular substance, denominated the sensitive sole, the blood vessels of which, secrete the horny sole. This part of the Foot is concave externally, beginning at the junction with the crust, and increases as it proceeds towards the centre, whereby the edge of the sole united to the crust, is the least concave internally, the sole is convex.

The object of the horny sole is to protect the sensitive one from injuries, and to act as a stop, by embracing the earth, and when the laminæ elongate, the horny sole descends. By this action of the horny sole, it in a great measure assists and helps the laminæ in defending them against the consequences arising from concussion, when the animal is ridden and in action.

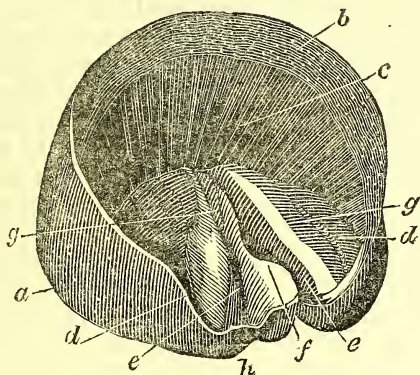
The bars or binders, as they are called by Shoeing Smiths and Farriers, are two in number, but which cannot, however be said fairly to belong to the sole, belonging more properly to the paries or crust of the hoof, and if this be minutely observed, they will be discovered to have more important functions than are usually attributed to them. The great obliquity of the bars, is unquestionably designed as a means of counteracting the effect of resistance and to diminish concussion, in order that the hoof should not increase.

Nature wisely ordered this termination, so that it might not only increase the ordinary elasticity of the foot; but become a main spring for counteracting and preventing contraction. So long as this exterior bearing continues, and they are permitted to maintain their due approach to the ground, so must they (the bars) prove an obstacle to contraction. although the Smith in the plenitude of his wisdom, supposing these parts to be superfluous and use-

less, and through his paring them out, the foot loses one of its main principles of support, which as a matter of course must increase in a double ratio the damage; as by so doing, the contraction begins, and the obliquity of the bars decrease. Other circumstances may be the means of, or bring on contraction; but the destruction of these parts is unquestionably a lamentable evil.

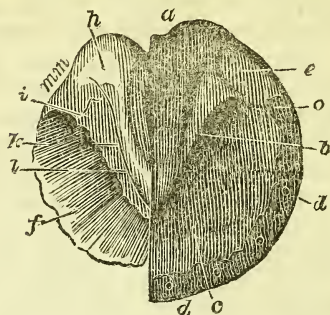
The toe or lesser part of the bars sometimes externally reaches pretty nearly as far as the toe of the frog. The bars internally in the hoof are laminated in a similar manner as the internal portion of the crust, and are affixed to the horny sole. The insensible laminæ also, are closely connected to the laminæ of the sensible sole. The natural hoof will be found to possess two large cavities between the frog and bars.

EXPLANATION.
a. The external Crust represented at the quarter.
b. The Coronary Ring. c. The Horny Laminæ.
d. The same continued over the Bars.



EXPLANATION.
e. The two concave surfaces of the inside of the Horny Frog.
f. That which externally is the cleft of the Frog.
g. The Bars. h. The rounded part of the Heels belonging to the Frog.

The frog may be denominated as that horny portion, which fills up the excavation made by nature in the under surface of the hoof, it as a body is not considered as susceptible of feeling, and is seated in the centre of the foot, bearing the resemblance of a wedge running to a point towards the toe and expanding as it proceeds towards the heels. This elastic body expands outwards beyond the immediate part it is in contact with, but not generally to such a degree as to reach beyond the level of the outer surface of the wall or crust; by which it evidently is a participator in, and must have its due share of pressure, A horizontal section of the inferior portion of the foot will demonstrate the frog to be a distinct secretion, and the difference of structure, between this and the horny parts with which it is in conjunction.

*The Inferior and Horny Frog.**

The frog is connected internally, with another, similar in form, but different in structure. The external frog is composed as heretofore observed, of soft elastic horn, and totally insensible: on the other hand, the internal frog has far greater elasticity, is sensible, and connected above with a small moveable or navicular bone, denominated sometimes the shuttle bone, and at the extreme points of the heels with two elastic substances denominated cartilages. The toe of the sensible frog is connected to the coffin bone; but even more than nine-tenths of each frog are behind it. The toe of the sensitive and horny frogs, form their conjunction with the coffin bone, are fixed points having no motion; but the heels of such frogs being seated posterior to the coffin bone, and in contact with moveable elastic (and not fixed or resisting) substances, a very extensive power of an acting lever is formed, so that whenever

Explanation of the Cut.

- * aa. One half of the Horny Frog
- b. One of the Bars. A cavity is seen between the side of the Horny Frog and one of the Horny Bars; opposed to part of the Vascular Sole, covering one of the Cartilages.
- c. One half of the Horny Sole.
- d. One half of the lower edge of the *paries* or crust that receives the nails.
- e. The junction of one of the Bars with the termination of one of the heels of the Crust behind the Coffin Bone, forming a flat seat for the heel of the Shoe.
- f. One half of the lower and anterior concave surface of the Coffin Bone. The Horny Frog and the Vascular secreting surface of the internal Frog, having both been removed.
- h. The heel of the sensible Frog attached to one of the lateral Cartilages.
- i. One of the inferior Cartilages attached to the Coffin Bone, to one of the side Cartilages, and to one of the lateral edges of the Vascular Frog.
- k. The line of connection between one of the lateral edges of the sensible Frog, and the inner lateral edges of one of the inferior Cartilages.
- l. The line of connection between a projecting edge on the lower surface of the Coffin Bone, and one of the inferior Cartilages.
- mm. The line of Connection between the inferior and lateral Cartilages.
- n. The heel of the Coffin Bone.
- o. The seat of Corn opposite the heel of the Coffin Bone.

the hoof comes in contact with the ground, the frog first ascends, and then contrariwise descends, this ascent of the frog causes the expansion of the cartilages, and protects the heels from contraction, yielding to the horse an elastic spring; whilst its wedge-like structure precludes the noble creature from sliding whenever it embraces the ground. The posterior superior portion of the frog is concealed by the flexible substances into which the sensitive sole mixes itself, forming the soft fleshy heels; from whence its lateral parts appear to be continued by a true prolongation, or otherwise, a firm or hard lamina of flexible horny matter is reflected from it, extending around the under part of the coronary ring, precisely below the vascular coronary ligament. Mr. Bracy Clark describes this part, and names it the Frog-stay, considering it as being ordained for the support and propping of the frog in its situation. Professor Coleman however, I believe denies its existence in *toto*. Mr. Clark also being at issue on another point, with the former Gentleman, in the belief of the use of the coronary ligament, as pointed out by Mr. Coleman. Mr. Clark admits however, that there is a process or enlargement of the strin within the coronary ring, and is not to be separated by maceration. It has been remarked, that there exists not such a quantum of horny matter in a plump, well made frog, as would appear from a common observance of the under surface of the foot; as the frog is situated in an inverted arch, with respect to the other parts in width, a plump, healthy frog forms not less than a sixth part of the whole. Betwixt the bifurcating of this portion, a hollow sinuosity appears, which is denominated its cleft; by means of this division, the frog receives a power of expansion, as well as a capacity of adapting itself to any rough surfaces the foot may have to journey over. The formation of the horny frog is completed by a secretion from the vascular one immediately over it, named the vascular, or sensible frog; from which it becomes liable to the same laws as the sole and hoof are governed; and of a natural consequence, it follows when grown to a needless extent, must detach itself of superfluity, by scaling and flaking away in like manner as the sole does. However it is needful to remark, that the growth of the frog is not frequently inordinate, but contrariwise in such horses as have frequently been shod, particularly should there remain the remotest inclination to contraction, the growth will be found scarcely adequate with the quantity

worn away; therefore in such cases, the unskilful Shoeing Smith may commit more damage by parings in a short time, than months will restore to its pristine condition, and a person who values his horse, ought well to watch the motion of the Smith. We know full well, that the Great Creator of the Universe sent nothing amongst us which may be termed useless, so also will the like reasoning bear in the conclusion, that every part of the animal economy was formed for the use and well doing of such animals, to which it is attached; if this be so, as it undoubtedly is, no member or organ, be assured, is formed, particularly, if liable to injuries without its formation being consonant to its natural functions. On looking around us, we see the bounties of the Deity to the animal kingdom, in providing coarser and longer hair as a shield against the inclemency of Winter, in those which are doomed to reside in the colder regions; those of the more temperate clime need not its protecting warmth, consequently have it not. To carry for an instant further this certain reasoning, do we not see how admirably constructed that beautiful organ the eye is to take in the light; the ear equally so for the vibration of sound; nay, every vessel, muscle, bone, and member of the animal structure is adapted for its peculiar function, and it then for an instant be imagined, that this organ, the frog, was bereft of the same Almighty Hand in its architecture, and was not made with the same inimitable wisdom as other parts of the frame. Have we any right in supposing otherwise, than that it was formed for receiving pressure, knowing from its convex form, its liability to touch the ground whenever it is in motion. The longer we observe with a scrutinizing eye and reasonable faculties, this fact, the more must reason imprint on our minds, that the function of the frog is to act as a preventive to the animal sliding, to keep the heels in an expanded state, and by its movement to act as a flexible spring to the superincumbent weight of the Horse. Many men of celebrity, with Mr. Saint-Bel among them, have given it as an opinion, that the object of the frog was to act as a cushion or guard to the tendon or flexor muscle of the foot consequently where such a motion is the prevalent one, it is not unnatural to suppose, that such persons would advise by art to raise the frog from the ground, by adopting a thick heeled shoe, for the purpose of protecting the tendon from bruising. If notwithstand-

ing, it be a fact, that this projecting substance was ordained to enter the earth, then from a parity of reasoning, it follows as a law of nature, that if the frog does not perform its functions, disease must of consequence follow in its train.

The legs of man are constructed for bearing the weight of the body; and should they be kept in a horizontal position, or in a state of inactivity and rest, they soon become weakened and enfeebled by disorder. The noble horse is intended as an animal for active service, and if he is allowed to continue for a length of time without having motion, his whole system will become affected. In truth the commonest investigation or observation, fully demonstrates that there is not an animal or any portion of an animal, which can be kept in fullness of health and hair, at the same time its natural functions is perverted. Had the true functions of the frog been in like manner understood, it then would have been deemed as necessary for the health of this organ, that it should come in contact with the earth, as we are well assured it is of vital importance that an active animal should have motion. It is easy to demonstrate the idea that the frog was not intended to protect the tendon. For there is not a Medical Man, who is in the slightest way acquainted with the structure and economy of tendons, but must be fully aware that the frogs of horses were never intended by the Divine Architect, to shield the tendons from being injured. It has been fully shown by experiment, that the substances of the healthy tendon has no feeling or sensation, and of consequence by that one insensitive body, i. e. the frog would never have been constructed for the preservation or guard of an organ devoid of sensibility.

From the frog having been formed in the shape of a wedge, a great portion of the tendon is not covered or protected by the frog, as about two thirds of it will be seen to project behind the tendon, and in such a case its form and size would have been completely equal to the tendons.

The method of Shoeing horses, rests in a great measure on the knowledge of the qualities and properties of the frog; and should the opinions here put forth, regarding its uses be correct, (which I am prone to opine they are) it must of necessity follow, that extirpating the frog, or portions of it with the knife, and lifting it from the surface of the ground by the artificial means of a thick heeled shoe, must paralyze its functions and either sooner or later engender disorder.

REVIEWS OF NEW WORKS.

“ Ye, who aspire true merit to defend,
Be bold to censure, eager to commend;
With mean complacence ne’er betray your trust,
Nor be so cruel as to prove unjust.”

A Treatise on Inflammations; explaining their Pathology, causes, consequences, and treatment, with their effects on the various Textures of the Body, &c.—By GEORGE ROGERSON, of Liverpool. Vol. i. pp. 459. 8vo.—Longman.

Since the celebrated Lectures of Dr. Thomson on Inflammations have been out of print, Medical and Veterinary Professors have long been in want of a work on this important subject; inasmuch, as the principles of these maladies are alike both in man and animals, and consequently it follows, that without a knowledge of these diseases, it is impossible for any practitioner to pursue his avocations upon scientific principles.—The work before us, supplies this deficiency, it being an extension of the Essay which received from the College of Surgeons the Jacksonian prize for 1828. We would suggest to the authorities of the Royal Veterinary College, the propriety of offering annual prizes for Essays on various subjects, by this means the Veterinary Profession would be greatly improved, and young practitioners would have a laudable zeal in contending for them; besides we believe the College funds are sufficiently large to spare yearly £50 for these purposes.

Our author arranges the different species of inflammations into four classes, in which they are very properly considered according to the general state of the affected part, during its inflammatory stages: *First*—Inflammations limited to a certain extent of structure. *Secondly*—Inflammations likely to spread. *Thirdly*—Those which during the inflammatory stage, disorganize structure, converting it into a nature *sui generis*. *Fourthly*—Inflammations arising from some morbid or poisonous matter on structure.”

“ One membrane alone may suffer from inflammation without communicating the affection to any other; and this property of disease, being confined to certain kinds of organized textures, varying anatomically, will be found to apply with equal force to membranes so connected as to form organs and systems. Thus, the structure of the mucous membrane of the stomach and bowels can have its secretions vitiated, or diseased; without the other textures adjoining and connected with it, as the muscular and serous, suffering. Inflammatory disorders of the muscular coat of the digestive organs can excite spasms of the stomach and colic of the intestines, without the other two membranes participating in this disorder or disease. The peritoneal coat is frequently found diseased, or inflamed, without

a trace of disease or inflammation being perceptible in the other membranes forming the organs that are either partially or wholly covered by it."

"This isolation of diseases, if I may use the expression, is mainly owing to the difference of structure in their respective membranes, and is applicable to every part of the body; for it seems to be a general law of the economy. Membranes of the same class are distributed over the body, but the disorders or diseases of one class will be the same in all, following the same course, and having the same symptoms, wherever they are seated, making allowance for the difference of symptoms as caused by some difference in structure and functions, which some of the membranes of the same class have in different parts of the body. It is thus, that the maladies of all serous membranes are the same, whether it be seated in the head, chest, or abdomen."

"This tendency of disease to become isolated to one membrane (or tissue), is sometimes not observed when two or more membranes, or all of the membranes forming an organ, are affected. Here, it commonly happens that the malady commences in one tissue, and then extends to the others in succession, according to their juxtaposition: but it is extremely rare to find membranes, or the whole organ or system, simultaneously inflamed or diseased."

With respect to the local symptoms of Inflammation, he observes that "ancient medical philosophers described but four—*pain, heat, redness, and swelling*. These, are found only in cases of acute common inflammation, and that only in certain structures. However, they neglected all mention of the disorder in the functions of the cellular membrane, the secretions of which, whether a fluid, or fat, or medulla, are always affected, and deviate from their physiological state. Their classification is artificial, made by the philosophers, but not by nature, and is more frequently erroneous than correct. Of the four they have enumerated, two are structural, viz. redness and swelling; and two functional, pain and heat. The alterations in structure, here described are imperfect, and those of the functions, still more so."

We have perused this volume with some gratification, and look forward with anticipation of pleasure for the second; it redounds no little credit to the author, who has ably investigated the numberless theories with which physiologists have confused this subject. His ideas on many points appear original, as also his views of the nature and treatment of inflammations, appear based upon the sound principles of Pathology. It is the only elementary work on this subject, and as Professor Coleman in his introductory lecture announced the intention of the Examiners of the Veterinary College, to be more severe (and very properly so) in many important points of Pathology, in their examinations of the pupils for the Diploma, we recommend the latter to give this work an attentive perusal, inasmuch, as it abounds with practical information.

A Vade-Mecum of Morbid Anatomy, with Pathological Observations &c. BY WILLIAM MONEY. *Illustrated by upwards of 250 Drawings.*—2nd Edit. royal 8vo.—Burgess & Hill. 1832.

The great affinity in *Morbid Anatomy*, between man and the various species of animals, induces us to notice this work: and to regret, that no similar one exists for the benefit of the Veterinary student, as regards the Pathological appearances in the structure of the Horse and domesticated animals; however, as we have been compelled to derive most of our knowledge in human physiology from the brute-creation; so in this point of study, the pupil of the Veterinary art will derive great information on the topics mentioned in Mr. Money's work, and comparing them with the morbid appearances he may witness at the Knackers, he will better comprehend the various appearances witnessed on dissection; the drawings are excellently executed, and the work is published at a moderate price.

The Honey-Bee; its Natural History, Physiology, and Management. By EDWARD BEVAN, M.D.—Post 8vo. pp. 404.—Baldwin and Cradock.

This is a truly scientific little work, and to those interested in the management of bees, will be found highly useful. We regret our limits will not allow of our making many extracts, we however, select those relative to some of the "*Diseases of Bees.*"

"If bees be not kept clean, and are not supplied with food in backward springs, particularly in those which succeed mild winters, a mortality is usually experienced, and prevails mostly in spring.—*Dysentery*, was attributed by Columella to the bees feeding upon honey collected from the blossoms of elm and spurge, and he thought it an annual distemper, others to the vernal honey, from whatever source derived; or being obliged to eat wax for want of proper food. Madame Vicat to candid honey. Reaumer's experiments to ascertain its cause failed. The symptoms of this disorder is indicated by the excrement, being muddy-black instead of a reddish yellow, and has an intolerably offensive smell. Also by its being voided on the floor and door of the hives, which bees generally keep very clean. Huish compares the morbid excrement to linseed. Vertigo, is supposed to arise, from the bees extracting honey from deleterious plants. This disorder is marked by a dizzy manner of flying, by irregular motions, as starting, falling down, &c. when the bees are pursuing their usual occupations. To these may be added lassitude and death. No remedy has been discovered for these maladies. *Tumefaction of the Antennæ*; they become swelled at their extremities, resembling a bud about to open, assuming a yellow colour, of which the forepart generally partakes; the bees becoming gradually languid and dying if not relieved early, it occurs in May. *Pestilence* has been attributed to bees, and is supposed to arise from their being kept dead in their cells—from a careless deposition of ova

by the queen, it has also been attributed to cold, and bad nursing, i. e. feeding with unwholesome food. The most successful treatment in all these maladies, (except vertigo) are *cordials—wine and sugar*. Dr. Bevan is of opinion they chiefly arise from hunger and filth. He therefore recommends *cleanliness and timely supplies of sugared ale*, particularly *during the months of February and March*, as the best preventive remedies to preserve bees in a state of healthful activity—and this recommendation is deserving attention from its being founded on experience.

An Introduction to the Study of Human Anatomy.—By JAMES PAXTON.—8vo. pp. 415.—Sherwood & Co.

As Veterinary students are in the habit of attending lectures on human Anatomy, as an auxiliary to their investigations of the structure of the horse and the lower animals, we sincerely recommend this excellent work to their perusal. The language is familiar and comprehensive, it is illustrated by a series of excellent wood engravings, selected from the works of the continental anatomists. We regret that Mr. Percival's Treatise on the Horse is not illustrated in a similar manner.

The British Flowering Plants.—By MR. BAXTER, Curator of the Oxford Botanic Garden. Nos. 1—5.—Parker, Oxford,

The engravings in these numbers are beautiful illustrations of the plants they represent. They are highly creditable to the Editors and Proprietors. Medical and Veterinary pupils will derive considerable information from a perusal of the descriptions.

ZOOLOGY.

Observations on the General Character of Fish. By SHARON TURNER, Esq., F. S. A.*

The general character of fish is not that of voracity and hostility. It is gentleness, harmlessness, sociality, and animation. They are peaceful animals, happy in themselves, and for the most part harmonizing together, without any general display of savage cruelty, or malignant passions. Such as are appointed to be food for others, die in that way, and are sought and taken for that purpose, where the appetite actuates, but no further. But they cannot be justly stigmatized as voracious for this habit, more than ourselves, for taking and eating them, and cattle, sheep, fowl, game, venison, and other living creatures.

We are carnivorous, but not voracious. We kill and cook the animals we feed on; but we have no malice or ill will, or hostility

* Extracted from Mr. Turner's Sacred History of the World.

in such action or diet, any more than in plucking the apple, grinding the corn, or boiling the potatoe. It is, therefore, unjust to impute peculiar voracity and destructiveness to these tribes; because some feed on smaller fish, and others on the molluscæ worms and insects they find. These latter animals appear to be specially provided for such as use them, as slugs and caterpillars are for birds, and grass for cattle; for, at particular seasons, the ocean is made to swarm with them, for no other visible purpose, than that the fish may derive nutrition from them.

The molluscæ, which supply so many of the natives of the sea with their subsistence, are, therefore, endowed with a power of multiplication, which, as in several other cases, astonishes us by its amount. It is the abundance of these pretty invertebrated animals of various species, so sedulously provided for the nutriment of the fish, which constitutes that luminous appearance, or phosphurescence of the sea, which so often surprises and delights the mariner on his watch in his nightly navigation.

If some species of fish are always eating, which is not by any means an authenticated fact, they would resemble the carnivorous quadrupeds, who pass their days in browsing and in resting rumination; neither can be fitly branded as voracious in such perpetual mastication; for what animal is milder or more inoffensive than the tranquil, though ever eating cow, who takes 100 lbs. of grass a day? But there are some facts which indicate that fish have been much misconceived in this respect; and that however it may be with some particular classes, or at particular seasons, the far greater number take less food, live with pleasure, and apparently from choice longer, without any ascertainable quantity of it, than any other tribe of animals we know of.

The gold and silver fish in our vases seem never to want any food; they are often seen for months without any apparent nourishment. Even the pike, which has been so much branded as a devouring glutton, fattens on total abstinence.

The salmon, although it comes in such multitudes from the ocean into the rivers, yet, when opened, is found never to have any nutritive substance in its stomach; an evidence of their taking none in that period of existence; for the herrings, when they shoal, are found, on being opened, to have fed largely on the sea caterpillar in their voyage.

The lamprey tribe are confessedly small, or no eaters.

Many facts of this sort will be recollected by the intelligent naturalist, which will lead him to inquire, whether the great majority of the finny world do not, for the longer part of their existence, content themselves with the nutrition they exact from water alone, without any additional substance.

The mild and harmless character of the fish class of being in its general prevalence, is impressibly exhibited by most of its largest tribes. The great Greenland whale pursues no other animal, leads

an inoffensive life, and is harmless in proportion to its strength to do mischief.

The massy Sturgeon is of the same gentle nature.

The formidable Narwhal, or Sea Unicorn, with all its size, and powerful weapon of offence, displays the same disposition.

The bronookomanati, which has been formed so huge in bulk, that twenty-seven men could not draw it out of the water; and the others of this tribe, of which some are twenty-eight feet long, and weigh 8000 lbs., are likewise gentle and peaceable animals.

These mightier chiefs of the finny nation are the true representatives of its general character. All are, for the most part, of the same mild, playful, animated, and unoffending placid animals, and have been so designed and organised, habited and stationed as to be continually of this temperament.

Remarks on the Power of Horses. By B. BEVAN, Esq.

To determine the average power of horses, under different kinds of labour, has been a subject deemed worthy of the inquiries of scientific writers. It is one of those points which can only be determined by actual experiment. The power to be maintained depends upon the velocity and the various formulæ given by Authors. The best of these, is that given by Professor Leslie. In the Period from 1803 to 1809, I had the opportunity of ascertaining, correctly, the mean force exerted by good horses in drawing the plough, having had the superintendence of the experiments on that head, at the various Ploughing Matches, both at Woburn and at Ashridge, under the patronage of the Duke of Bedford and the late Earl of Bridgewater. I find among my memoranda the result of Eight Ploughing Matches, at which there are seldom fewer than seven teams, as competitors for the various prizes. The first result is from the mean force of each in six teams, of two horses each team, upon a light sandy soil—156 lb.; the second result is from seven teams, of two horses each team, upon loamy ground, near Great Berkhamstead,—154 lbs.; the third result is from six teams, of four horses each team, with old Hertfordshire Ploughs,—127 lb.; the fourth result is from seven teams, of four horses each team, upon strong stony land (improved ploughs),—167 lb.; the fifth result is from seven teams, of four horses each team, upon strong stony land (old Hertfordshire ploughs)—193 lb.; the sixth result is from seven teams, of two horses each team, upon light loam,—177 lb.; the seventh result is from five teams, of two horses each team, upon light sandy land,—170 lb.;—the eighth result, is from seven teams of two horses each, upon sandy land,—160 lb.

The mean force exerted by each horse, from fifty-two teams, or 144 horses, was 163 lbs. each horse, and, although the speed was not particularly entered, it could not have been less than the rate of

24 miles per hour. As these experiments were fairly made, and by horses of the common breed used by farmers, and upon ploughs from various counties, these numbers may be considered as a pretty accurate measure of the force actually exerted by horses at plough, and which they are able to do without injury for many weeks;—but it must be remembered, that if these horses had been put out of their usual walking pace, the result would have been very different.

UNIVERSITY OF LONDON.

Opening of the Veterinary Medical Class. By Professor Youatt, F.L.S., F.Z.S., &c. &c.

This Gentleman resumed his excellent Lectures on the Anatomy, Physiology, and diseases of all domesticated animals, on the 3rd of December last, at the above University. When we consider the importance of the Veterinary profession, we cannot but feel gratified at the establishment of a second Veterinary Medical School in this Metropolis. The worthy Professor's Lecture was not only attended by some of his talented Professorial brethren of the University, but likewise by many private Medical Teachers, as well as Practitioners eminent for their knowledge in Human and Veterinary Medicine and Surgery. Mr. Youatt announced an improvement in this school, and which we should like to see imitated at the Royal Veterinary College; of annual examinations for prizes and certificates of honour, and what will render these more valuable to the professors, will be the *publicity of the examinations, conducted solely by Veterinary Surgeons*; who of course are the best qualified to decide on the competency or incompetence of the pupils.

DEATH OF MR. ATKINS' LION-TIGER CUBS.

Many of our readers may recollect, that Mr. Atkins, the well-known proprietor of the Itinerant Menagerie, succeeded, some years ago, in breeding cubs from a lion and tigress. These lion-tigers he has never been able to rear beyond the growth of the mane on the one, and of dentition in the other. All have died in a similar manner; the two last, an esteemed Correspondent informs us, have recently died in Norfolk. We shall consider it a favour conferred on Zootomical and Pathological Science, if any of our readers can forward us an account of their Zoological peculiarities, and the appearances they present on Dissection.

ON AUSCULTATION IN ANIMALS. By R. SPITAL, Esq.

It has been recommended that Auscultation should be applied in the diagnosis of diseases in the lower animals. Such would be highly useful, and this department of Auscultation we mention to the Veterinarian, in the hopes, that ere long, we shall see some light thrown, by his means, upon the diagnosis of pectoral complaints in these animals, hitherto so very obscure. In the mean time, what has been said with regard to the various signs of disease in man, will, we believe, apply, to a certain extent, to the lower animals also. Such we infer from their structure, not from any experience in this application of Auscultation.